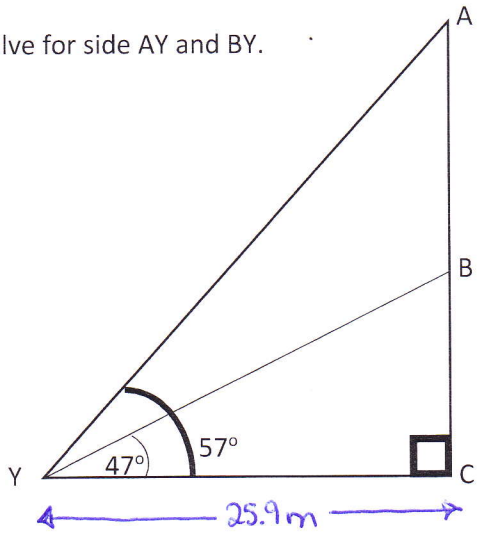
5.5 Solving Double Triangles

Example 1: Solve for side AY and BY.



ΔAYC

$\cos 57° = \frac{25.9}{AY}$

$AY = \frac{25.9}{\cos 57°}$

$AY \doteq 47.6$

ΔBYC

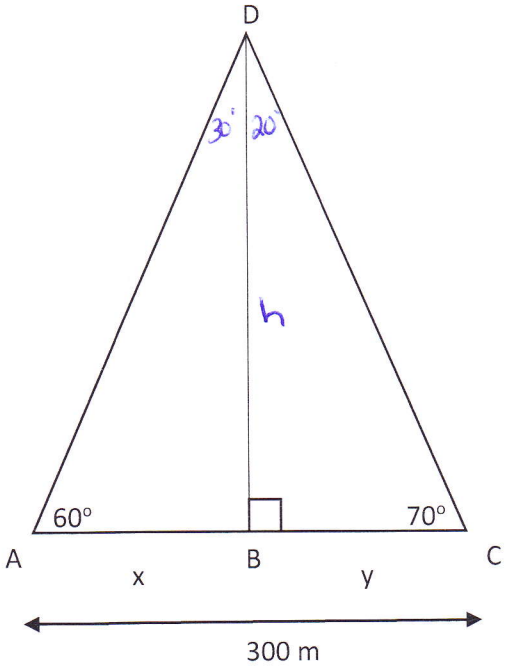
$\cos 47° = \frac{25.9}{BY}$

$BY = \frac{25.9}{\cos 47°}$

$BY \doteq 38.0$

∴ side AY is 47.6m and side BY is 38.0m.

Example 2: Find the height of the triangle, to the nearest metre.



ΔABD

$\tan 30° = \frac{x}{h}$

$x = h\tan 30°$

ΔCBD

$\tan 20° = \frac{y}{h}$

$y = h\tan 20°$

Since $x + y = 300$ then

$h\tan 30° + h\tan 20° = 300$

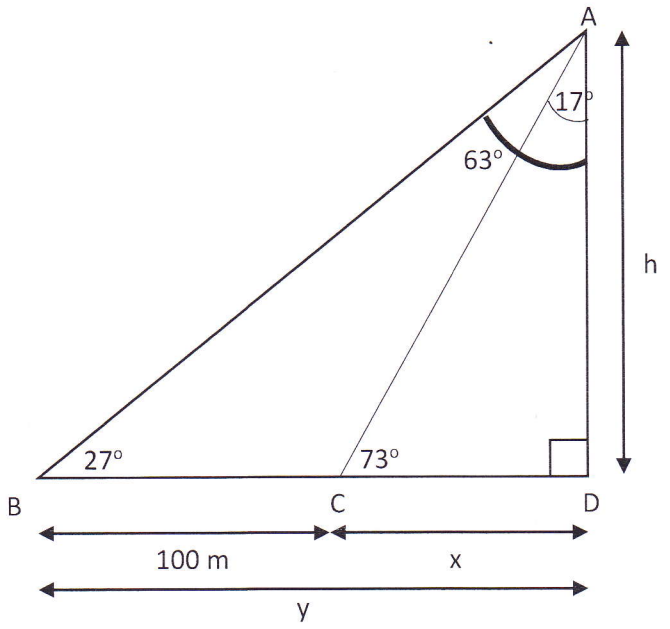
$\frac{h(\tan 30° + \tan 20°)}{(\tan 30° + \tan 20°)} = \frac{300}{(\tan 30° + \tan 20°)}$

$h = \frac{300}{\tan 30° + \tan 20°}$

$h \doteq 319$

∴ the height of the triangle is 319 m.

Example 3: Find the height of the triangle



ΔABD

$\tan 63^\circ = \frac{y}{h}$

$h \cdot \tan 63^\circ = y$

$y = h\tan 63^\circ$

ΔACD

$\tan 17^\circ = \frac{x}{h}$

$x = h\tan 17^\circ$

$y - x = 100$

$h\tan 17^\circ - h\tan 63^\circ = 100$

$\frac{h(\tan 17^\circ - \tan 63^\circ)}{(\tan 17^\circ - \tan 63^\circ)} = \frac{100}{(\tan 17^\circ - \tan 63^\circ)}$

$h \doteq 60$

$\therefore$ the height of the triangle is 60 m.